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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/065,262	09/30/2002	Michael J. Scaggs	1443.01	5670

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STALLMAN & POLLOCK LLP
353 SACRAMENTO STREET
SUITE 2200
SAN FRANCISCO, CA 94111

EXAMINER	
BUEKER, RICHARD R	

ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 04/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/065,262	SCAGGS, MICHAEL J.	
	Examiner	Art Unit	
	Richard Bueker	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 October 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20,37-41,44,45,47-55,89 and 90* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20, 37-41, 44, 45, 47-55, 89 and 90* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *6/1/04 (pg. 1)*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

An initialed copy of page 1 of the IDS filed June 1, 2004 is attached, with the cited US patents initialed. These references were considered at the time of the previous office action, but were inadvertently not initialed at that time.

Claims 16 and 17 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention for the reasons stated in the previous office action. Applicant didn't discuss this rejection, and applicant is respectfully requested to do so in his next response.

Claims 1-20 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for "flow control means creating a flowing layer of liquid", "with the thickness of the layer being in the range of 25 to 100 microns", does not reasonably provide enablement for "flow control means creating a flowing layer of gas", "with the thickness of the layer being in the range of 25 to 100 microns". It is noted that the use of the word "fluid" in the phrase "flowing layer of fluid" includes both gas and liquid. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims. The claim 1 recitation of a flowing layer of fluid that is 25 to 100 microns thick should be amended by replacing "fluid" with "liquid". See para. 10 of the specification.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-10, 12-13, 15, 37-41, 44-45, 47-53 and 89-90 are rejected under 35 U.S.C. 102(a) or (b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Tam (J. Appl. Phys., April 1992) (Fig. 4) who discloses a laser processing apparatus comprising a fluid conduit and flow control means which atomizes a liquid and supplies the atomized vapor to a substrate to be processed. The nozzle of Tam is coupled to a reservoir of liquid water for propelling a fine spray of vapor of the liquid water onto the workpiece. Regarding claim 4, the copper tube of Fig. 4 of Tam is a fluid conduit as claimed and the burst gas inlet is a propellant conduit adapted to discharge propellant. Limitations such as the type of propellant gas recited in claims 7-10, the thickness of the liquid layer on the workpiece recited in claims 43-45, and the pressure recited in claims 51 and 52 are process type limitations and are in effect recitations of intended use of the claimed apparatus. The apparatus of Tam is inherently capable of being so used. Regarding the computer processor recited in claims 12, 13 and 15, Tam's timing generator and laser trigger means is inherently or at least obviously a microprocessor based controller.

Claims 1-10, 12-13, 15, 37-41, 44-45, 47-53 and 89-90 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tam (J. Appl. Phys., April 1992) taken in further view of Zhu (Laser ablation of solid substrates in a water-confined environment) (see page 1397, col. 1, lines 24-26) or Zapka (efficient pulsed laser removal of 0.2 μm sized particles from a solid surface) (see page 2218, col. 1, last para.). Zhu teaches that water vapor condensation processes can form films of 50 μm thicknesses, which indicates that Tam's water vapor condensation process would inherently be capable of forming 50 μm water films. Also, Zapka teaches that a water vapor condensation process can be controlled to provide a desired water film thickness. Therefore, one skilled in the art would have considered Tam's water vapor condensation means to be inherently or at least obviously capable of forming a 50 μm thick water film.

Claims 12, 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tam (J. Appl. Phys., April 1992), optionally taken in view of Zhu or Zapka for the reasons discussed above, and taken in further view of Elliot (5,669,979) (see Fig 15, for example), who teaches the use of a computer controller to control all aspects of a laser processing apparatus. If for argument's sake, Tam's apparatus did not include a computer processor as recited in claims 12, 13 and 15 it would have been obvious to automate the apparatus of Tam by providing it with a computer controller in the manner illustrated by Elliot to improve its efficiency of operation.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tam (J. Appl. Phys., April 1992), optionally taken in view of Zhu or Zapka for the reasons discussed above, and taken in further view of Moore (5,601,107). Tam teaches (page

3519, lines 1-7) the use of air or nitrogen as his carrier gas, but Tam doesn't discuss the use of a reservoir for his air or nitrogen. Moore (see Fig. 2, for example) is cited to show that gas sources are conventionally contained in a reservoir with a valve as recited in claim 17. It would have been obvious to supply the carrier gas of Tam by connecting a gas reservoir of the type described by Moore, containing the carrier gas, to Tam's vapor source. Also, Johnson (5,622,622) (see abstract) is cited of interest to show that air and nitrogen is each inherently a "light-reactive chemical" as recited in claim 17. Therefore, the air or nitrogen carrier gas of Tam is inherently a "light-reactive chemical" as recited in claim 17.

Claims 4-5, 11, 18, 37-41, 44-45, 47-55, and 89-90 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tam (J. Appl. Phys., April 1992), optionally taken in view of Zhu or Zapka for the reasons discussed above, and taken in further view of Roth (Specific Surface Treatment by Laser Irradiation Under Fluid Films), Uziel (6,827,816) and Drzal (6,565,927). Roth (see Fig. 2, for example), Uziel (see Fig. 3 and col. 5, lines 27-39, for example) and Drzal (see Fig. 1 and col. 9, lines 19-27, for example) are cited for their teachings regarding means for spraying an atomized liquid onto a workpiece to form a thin film of liquid on the workpiece. It is noted that Uziel specifies steam spraying, and steam is an atomized liquid. If, for argument's sake, the spray nozzle of Tam were not considered to inherently be an atomizing means as recited in claim 5 or for propelling a fine spray of the liquid as recited in claim 37, it would have at least been obvious to provide a laser processing apparatus of the type disclosed by Tam with an atomizing means and/or a nozzle for propelling a fine spray of

liquid, because Roth, Uziel and Drzal teach that a thin layer of liquid as desired by Tam can be provided by a fine liquid sprayer. Regarding claims 11 and 18, Uziel (Fig. 3, for example) teaches the use of a fluid vacuum drainage conduit adapted to withdraw fluid discharged across a workpiece, wherein the fluid is discharged by a steam pulse discharging means, which has an inherent capability of forming a layer having a thickness in the range of 25 to 100 μm. It would have been obvious to use such a fluid vacuum in the apparatus of Tam because Uziel (col. 5, lines 27-39) teaches that gas, liquid and solid products desirably can be removed simultaneously in this way. It is noted also that Roth also teaches the use of a drainage conduit to recover excess fluid, and .

Claims 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tam (J. Appl. Phys., April 1992), optionally taken in view of Zhu or Zapka, and in further view of Roth (Specific Surface Treatment by Laser Irradiation Under Fluid Films), Uziel (6,827,816) and Drzal (6,565,927) for the reasons discussed in the preceding paragraph rejection, and taken in further view of Elliot (5,669,979). It is noted that Uziel (see Fig. 3 and col. 5, lines 27-39, for example) teaches the step of directing a steam pulse from tube 70 onto a workpiece, followed by a dry gas flow, which is a propellant, onto the workpiece from the tube 70. It would have been obvious to modify the apparatus of Tam to practice this process suggested by Uziel, and it also would have been obvious to use a computer controller of the type taught by Elliot to control this process suggested by Uziel.

Claims 1 and 17 are rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Franca (6,178,973). Franca (Fig. 2, for example) discloses a laser processing apparatus having a work platform for holding a workpiece and a fluid conduit adapted to discharge fluid across the workpiece. The conduit includes flow control means that are inherently capable of creating a flowing layer of liquid such as water in a thickness range of 25 to 100 microns. Franca's apparatus includes a reservoir 12 holding a light-reactive chemical (ozone). The water and light-reactive chemical can be introduced through the same conduit (see col. 5, lines 26-50). It is noted also that Franca (col. 5, lines 34-37) also teaches that other light-reactive chemical supplies can be connected to the conduit.

Claims 1 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Franca (6,178,973) taken in further view of Zhu (Laser ablation of solid substrates in a water-confined environment) (see page 1397, col. 1, lines 24-26) or Zapka (efficient pulsed laser removal of 0.2 μm sized particles from a solid surface) (see page 2218, col. 1, last para.). Zhu teaches that water vapor condensation processes can form films of 50 μm thicknesses, which indicates that Tam's water vapor condensation process would inherently be capable of forming 50 μm water films. Also, Zapka teaches that a water vapor condensation process can be controlled to provide a desired water film thickness. Therefore, one skilled in the art would have considered Franca's water vapor condensation means to be inherently or at least obviously capable of forming a 50 μm thick water film.

Claims 1 and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uziel II (WO 00/38935) taken in view of Yogev (6,627,846) and Franca (6,178,973), and optionally taken in further view of Zhu (Laser ablation of solid substrates in a water-confined environment) (see page 1397, col. 1, lines 24-26) or Zapka (efficient pulsed laser removal of 0.2 μm sized particles from a solid surface) (see page 2218, col. 1, last para.). Uziel II (WO 00/38935) (see Fig. 4) discloses a laser processing apparatus having a work platform for holding a workpiece and a fluid conduit 56 adapted to discharge fluid across the workpiece. The conduit includes flow control means that are inherently capable of creating a flowing layer of liquid such as water in a thickness range of 25 to 100 microns. Fig. 4 of Uziel II also includes a drainage conduit 58 to recover excess fluid as recited in claim 18. Conduits 56 and 58 are fluidly coupled as required by claim 19. Also, Yogev (6,627,846) (see col. 7, line 5 to col. 8, line 2) teaches a process of treating a workpiece with a laser in which steam and a light-reactive chemical are simultaneously supplied to a workpiece. Yogev (see sentence bridging cols. 5 and 6) specifically suggests that his process be practiced using the apparatus of Uziel II (WO 00/38935), and therefore it would have been obvious to adapt the apparatus of Fig. 3 of Uziel II to practice the process of Yogev. Yogev does not discuss details of how the steam and light-reactive chemical are simultaneously supplied to the workpiece. Franca (see col. 5, lines 10-50, and particularly lines 39-50) , however, teaches that it is preferred to mix steam and a light-reactive chemical and then supply the mixture to the workpiece through the same conduit. In view of this teaching of Franca, it would have been obvious to adapt the apparatus of Uziel II for supplying a

mixture of the steam and light-reactive chemical of Yogev to the workpiece through the conduit 56 of Fig. 4 of Uziel II. Also, Zhu and Zapka make clear that a steam source of the type suggested by Yogev or Franca is inherently or at least obviously capable of forming a water layer of the presently claimed thickness.

Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uziel II (WO 00/38935) taken in view of Yogev (6,627,846) and Franca (6,178,973), and optionally taken in further view of Zhu (Laser ablation of solid substrates in a water-confined environment) (see page 1397, col. 1, lines 24-26) or Zapka (efficient pulsed laser removal of 0.2 μm sized particles from a solid surface) (see page 2218, col. 1, last para.) for the reasons stated in the previous paragraph rejection of claims 1 and 17-19, and taken in further view of Elliot (5,669,979). Regarding claims 19 and 20, the apparatus of Elliot includes a drainage conduit for filtering and recirculating excess fluid (see Fig. 11 and col. 17, lines 39-48 and col. 20, lines 52-61). Elliot teaches that it is desirable to reconstitute and reuse the process gases exhausted from a laser processing apparatus for the desirable purpose of reducing processing costs. Therefore, it would have been obvious to reconstitute and recirculate process gas in the apparatus of Uziel II for the desirable purpose of reducing processing costs.

Claims 1 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roth I (Novel technique for high-quality microstructuring with excimer lasers) taken in view of Drzal (6,565,927), Roth II (Specific Surface Treatment by Laser Irradiation Under Fluid Films) and/or Zhu (Laser ablation of solid substrates in a water-confined environment). Roth I (Novel technique for high-quality microstructuring with excimer

lasers) (Fig. 2) discloses a laser processing apparatus (see Fig. 2 of Roth I) in which excess fluid is filtered and recycled, and a control valve is disposed between a reservoir and a fluid conduit connected to a nozzle. Regarding the thickness of the applied liquid layer, Drzal teaches that conventional atomizer sprayers produce droplets of 1 micron in diameter, and thus has an inherent capability of forming a layer thickness of 100 microns. It would have been obvious to use such a conventional atomizer as Roth's atomizer. Also, Roth II and Zhu both teach the use of a water vapor condensation source to form a thin water layer for laser ablation. In view of those teachings it would have been obvious to modify the apparatus of Fig. 2 of Roth I (which includes fluid filtering and recycling means), by providing it with a water vapor condensation film forming means of the type described by Roth II or Zhu. Such a water vapor condensation film forming means has an inherent capability of a layer of the thickness recited in claim 1.

Applicant has argued that Roth (1 and 2), Tam and Zapka do not use thin layers in the recited range of 25 to 100 microns. It is noted, however, that the present apparatus claims are not limited to use only with a layer thickness of 25 to 100 microns. The recitation of a particular layer thickness is a recitation of intended use that merely requires the presence of a layer forming means that is inherently capable of forming a layer of the recited thickness. It is noted that Zhu makes clear that a steam condensation means is inherently capable of producing a water layer having a thickness of 50 microns. Therefore, the steam condensation means of Tam is inherently capable of producing a water layer within the claimed range of 25 to 100 microns.

Applicant has argued that Roth 2 teaches that his liquid layer is several 100 microns thick. It is also noted, however, that Roth 2 states that measuring surface thickness is problematic because of bubble formation. Roth doesn't state what the layer thickness when the liquid is not bubbling. It is noted also that Drzal teaches that conventional atomizer sprayers produce droplets of 1 micron in diameter, and thus an atomizer such as Roth's has an inherent capability of forming a layer thickness of 100 microns.

Applicant has argued that the claims recite a laser machining apparatus. This argument is not persuasive. Claims 1-20 and 89-90 actually recite a spray coating apparatus. No laser is positively recited and no laser is required in the apparatus combination of claims 1-20 and 89-90. Also, it is noted that the verb "machine" is defined as "to process by or as if by machine". The cited prior art discloses machines that process a workpiece by use of a laser, and therefore meet the claim 37 limitation of "the workpiece may be machined" by a laser. Also, Tam's apparatus is inherently capable of ablating a workpiece if so desired.

Further regarding the ablation argument, it is noted that none of the claims recite ablation, and furthermore, applicant's own specification in the sentence bridging pages 10 and 11, specifically teaches that the laser power should be below the ablation threshold of the workpiece. Therefore, applicant's ablation argument is not convincing.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Bueker whose telephone number is (571) 272-1431. The examiner can normally be reached on 9 AM - 5:30 PM, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parvis Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Richard Bueker
Primary Examiner
Art Unit 1763